

Development of Strategies for Energy-Efficient Transition from Low Pressure Non-Reinforced Concrete Pipe

Goal: This research project will enable farmers to convert to pressurized irrigation (drip and sprinkler). It will reach a large number of farmers who presently must either surface irrigate if they use irrigation district water, or who must depend on wells if they want to use pressurized irrigation.

Technology Path: There are approximately 1,400 miles of low pressure non-reinforced cast-in-place ("monolithic" or "CIP") concrete pipe in California irrigation districts. They are predominately found on the east side of the San Joaquin Valley, from Manteca in the north to Visalia in the south. Many of these pipelines were installed in the early 1900's. Most of these pipes are deteriorating and will need to be replaced within the next 10-20 years.

Irrigation districts have attempted to find new ways to repair these pipes. However, their uneven dimensions (they were often made with crude local installation equipment), high density of repairs (meaning that the pipe wall thicknesses and cross sections now vary), numerous connections, and non-linear placement have ruled out using available pipe liner technology. The cost to line these pipes is about the same as the cost to completely replace the pipelines.

However, the districts must not only replace the pipe itself - they must change the way they deliver the water to their customers. The old pipelines were designed for surface irrigation (on-farm) but many farmers now need water for pressurized irrigation methods. Irrigation districts have many questions about how to make the transition, including:

- a. Should the new pipeline be capable of supplying water for both surface and pressurized irrigation methods?
- b. Should the water be pressurized by the district at the canal, so that farmers do not need to pressurize the water with smaller, less efficient pumps?
- c. Should the water be filtered, and if so, to what degree?
- d. How should the new pipelines be integrated with the old, existing CIP pipelines?

This research project will examine 4 irrigation districts with large amounts of CIP which are facing these questions. The 4 irrigation districts might include:

- a. South San Joaquin ID (Manteca)
- b. Modesto ID
- c. Turlock ID
- d. Chowchilla WD
- e. Fresno ID
- f. Consolidated ID

g. Merced ID

Principal Investigator:

Dr. Charles Burt, CalPoly San Luis Obispo University, Irrigation Technology Research Center, is the project manager.

